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Alle für die Redaction bestimmten Sendungen sind zu richten an: Redaction des Botanischen Centralblattes, Haarlem (Holland), Spaarne 17.

Compton, R. H., An Anatomical Study of Syncotyly and Schizocotyly. (Ann. Bot. XXVII. p. 793—821. 41 textfig. 1913.)

The present paper is divided into two parts, dealing respectively with syncotyly and schizocotyly. In the first part the anatomy of normal and syncotylous seedlings of *Swainsona Cadelli, Helianthus annuus* and *Prunus domestica* are described and compared. In *Swainsona* the lateral union of the cotyledons produces practically no modification in the vascular anatomy, while, in the layer seedlings of *Helianthus* and *Prunus,* syncotyly leads to elimination and compression of vascular bundles together with reduction in the type of symmetry of the root. After these observations have been dealt with, the whole subject of syncotyly is discussed, special stress being laid on the quaestion of the nature of the so-called syncotylous seed-leaf of *Ranunculus ficaria* which the author is in favour of regarding as a single cotyledon. As regards syncotyly in general the author shows that:

1. Syncotyly occurs in a great variety of species, normally or teratologically.

2. In species with albuminous seeds syncotyly usually gives rise to a symmetrical cotyledon tube.

3. In species with exalbuminous seeds syncotyly is usually asymmetrical, the cotyledons uniting along one edge only.

4. The reason for (2) is probably the homogeneity of the surroundings of the embryo before germination, for (3) the asymmetry of its environment which produces accumbency and other irregularities.

In the second part of the paper the structure of a number of schizocotylous seedlings is described and compared in each case with the normal type. The species studied were *Cannabis sativa, Phacelia tanacetifolia, Antirrhinum majus, Scrophularia nodosa, Amaranthus speciosus, Clarkia pulchella, Papaver rhoeas, Lepidium sativum, Carmichaelia australis* and *Helichrysum bracteatum*. The literature of schizocotyly is then dealt with and the subject is discussed in its theoretical aspect with critical reference to the views of Hill and de Fraine.

The author concludes that dicotyly is a primitive character — whether for monocotyledons, or for teratological syncotyls and schizocotyls, for polycotylous *Proteaceae* and *Loranthaceae*, or for *Gymnospermae*. Agnes Arber (Cambridge).

Goc, M. J. le, Observations on the Centripetal and Centrifugal Xylems in the Petioles of *Cycads*. (Ann. Bot. XXVIII. p. 183—193. 1 pl. 1 textfig. 1914.)

Many different interpretations have been suggested by different botanists to account for the peculiarities of the foliar bundle in the *Cycads,* and Chodat has drawn attention to the need for a reconsideration of the whole problem. The object of the present paper has been to throw some fresh light on the subject by means of an examination of five genera of *Cycads* including seven species, *Cycas circinalis, C. revoluta, Stangeria paradoxa, Dioon edule, Ceratozamia mexicana, Encephalartos horridus* and *E. villosus*. The author points out that the mode of transition from the stem type of xylem to the petiolar arrangement of that tissue has hitherto been generally overlooked. He also gives some interesting information upon wound-structures, but concludes that such structures artificially induced are without any direct bearing on the phylogenetic interpretation of the bundle. The final conclusions are as follows:

At the very base of the petiole the structure of the vascular bundles of *Cycads* is entirely centrifugal, and assumes different forms, concentric, collateral, or a combination of both. The centrifugal xylem at the base is, at least in its main bulk, a secondary growth. The centripetal xylem is a primary structure laid down at an early age but only gradually lignified. The centrifugal xylem and centripetal xylem are probably distinct in origin, juxtaposed in response to physiological demands but morphologically discontinuous. During most of the course along the petiole the two xylems remain distinct, therefore the bundle is more properly called pseudo-mesarch or diploxylic. The two xylems overlap at their ends. The remains of centripetal xylem scattered at the base might point to a time when it ran further down, perhaps into the stem.

Agnes Arber (Cambridge).

Hemenway, A. F., Studies on the phloem of the Dicotyledons. II. The evolution of the sieve tube. (Bot. Gaz. LV. p. 236—243. pl. 11. Mar. 1913.)

A study of 140 genera of Dicotyledons leads to the grouping of sieve tubes in three classes: 1) with a long tapering end wall, and the lateral and terminal sieve plates alike; 2) with end walls less oblique, and the lateral sieve plates less well developed; 3) with end walls nearly at right angles to the length of the tube, and a

single sieve plate on the end wall. The lists adduced show that the woody Dicotyledons are found in the first of these classes, which is also the type of conifers, while the herbaceous Dicotyledons occur either in the third class or between the second and third class. These facts add to the evidence for the view that the herbaceous Dicotyledons have been derived from woody plants.

M. A. Chrysler.

Holden, R., Ray tracheids in the Coniferales. (Bot. Gaz. LV. p. 56—65. pl. 1—2. Jan. 1913.)

A careful search shows ray tracheids to be present in various genera of *Cupressineae* and *Taxodineae,* where they had previously been reported as absent. They generally occur in connection with wounds in these families, while they are normal in most genera of *Abietineae.* They sometimes occur on the margin of a ray, but when scarce are more apt to constitute the whole of a narrow ray. It is pointed out that *Pityoxyla* from the Middle Cretaceous on show ray tracheids, and from this fact and the evidence derived from traumatic reactions it is inferred that the *Taxodineae* and *Cupressineae* sprang from the *Abietineae* at some time after the Middle Cretaceous, also that *Podocarpineae, Taxineae* and *Araucarineae* came off from *Abietineae* at some time before the Middle Cretaceous.

M. A. Chrysler.

Salisbury, E. J., The Determining Factors in Petiolar Structure. (New Phyt. XII. 8. p. 281—289. 4 Tab. 1913.)

In *Clematis* sp., *Bignonia* and *Clerodendron* sp. it is shewn that a definite relation exists between the transpiring surface of the leaf and the xylem development in the petiole; an indication was obtained also that a correspondence exists between the xylem development and the rate of transpiration. Local variations do not appreciably affect the final result provided that they extend only over a short distance.

Some observations on sun and shade leaves of *Stachys sylvatica* indicate that their different potentialities for transpiration are such as to almost exactly equalise the differences in the humidity of their habitat.

In *Rheum* and *Rumex* increase in petiolar bundles corresponds with increase in leaf area.

The author concludes that the functions of the leaf have a profound influence both upon the amount and arrangement of the xylem.

E. de Fraine.

Aulin, F. R., Bildningsafvikelser hos *Cytinus alpinus* och *Acer platanoides.* (Svensk Bot. Tidskr. VII. 2 Textfig. 1913.)

Folgende Bildungsabweichungen werden aus Mittelschweden beschrieben und abgebildet.

An *Cytisus alpinus* war der Blütenstand durchwachsen; bei wenigblütigen Trauben trug der apikale Achsenteil zahlreiche, bei reichblütigen wenige Laubblätter. Im folgenden Frühjahr waren diese Sprosse abgestorben. Die durchwachsenen Sprosse wurden nur an den stehen gebliebenen Teilen abgeschnittener Zweige, wo die Reservenahrung sich angehäuft hatte, beobachtet.

An einem Strauch von *Acer platanoides* mit abgebrochener

Stammspitze war ein Spross ausgewachsen mit an der Hauptachse gegenständigen, an den schwächeren Seitenachsen in dreigliedrigen Quirlen angeordneten Blättern. Nach Propfen blieb die Quirlstellung konstant. Grevillius (Kempen a. Rh.).

Guppy, H. B., Studies in seeds and fruits. (London, Williams and Norgate. 1913. Prise 15 shillings net.)

The author gives a detailed account of many seeds in their relations to water, as determined chiefly with the aid of the balance and the oven. Permeability and hygroscopicity are discussed in their various bearings, together with other aspects of seed-life which do not usually come under close observation.

W. E. Brenchley.

Heckel, E., Sur la nature morphologique et anatomique des graines et des écailles séminales du *Spermolepis gummifera* Brongniart et Gris; présence de canaux sécréteurs dans la moelle et dans la zone périmédullaire de ce végétal. (Bull. Soc. bot. France. LVIII. p. 491—499. 1911.)

Les écailles qui entourent la graine de *Spermolepis gummifera* représentent bien, comme le pensaient Brongniart et Gris, des ovules restés stériles, plus ou moins atrophiés et aplatis; il existe du reste, dans le fruit mûr, tous les intermédiaries entre une graine parfaite et ces écailles. Les cotylédons, dans la graine fertile, sont divisés en cinq lobes profonds.

La tige, riche en tannorésine, présente des poches sécrétrices dans l'écorce, des canaux sécréteurs anastomosés dans la zone périmédullaire, fait unique dans les Myrtacées, et enfin, dans le liber normal et la zone périmédullaire, des éléments tannifères allongés suivant l'axe de la tige et placés bout à bout. L'épiderme de la tige et de la feuille montre des ponctuations rouges résultant de l'acumulation de la tannorésine dans les stomates et leurs cellules bordantes; dans la feuille, les poches sécrétrices déterminent, de plus, de petites ponctuations beaucoup plus nombreuses.

H. Chermezon.

Lagerheim, G., Om „Ouvirandrano" och växternas nätblad. [Ueber „Ouvirandrano" und die Netzblätter der Pflanzen]. (Fauna och Flora. p. 34—44. 1 Taf. 6 Textfig. Uppsala, 1913.)

Zuerst werden die morphologischen und ökologischen Verhältnisse, sowie die Verbreitung der *Aponogeton*-Arten an der Hand der Literaturangaben besprochen. Verf. hebt hervor, dass „Netzblätter" ausser bei *Aponogeton fenestralis* („Ouvirandrano" der madagassischen Eingeborenen) und anderen *A.*-Arten auch bei verschiedenen Algen und Flechten mit blattartigem Thallus vorkommen.

Eine aus Madagaskar stammende *Aponogeton*-Form, die im Gewächshaus der Universität zu Stockholm kultiviert wurde, zeigte im Bau der Blattspreiten Aenlichkeit mit *A. Guillotii,* indem die Maschen des Netzes enger als bei *A. fenestralis* waren und die für letzere Art charakteristische stachelige Spitze fehlte, stimmte aber im übrigen mit *A. fenestralis* überein. Verf. betrachtet sie als eine Hemmungsform der letzteren, dadurch entstanden, dass sie ihre Entwicklung in stehendem Wasser durchmachte. Die Bestäubung kommt bei dieser Form wahrscheinlich teils durch das Wasser

teils durch Insekten zustande; ausserdem dürfte Selbstbestäubung vorkommen: die Antheren berühren öfters die Narben während der Anthese. Die Frucht reift unter Wasser, löst sich (wie bei dem von Wettstein untersuchten *A. Guillotii*) von der Achse und berstet. Die Form ist oft vivipar. Grevillius (Kempen a. Rh.).

Mc Allister, F., Nuclear Divison in *Tetraspora lubrica.* (Ann. Bot. XXVII. p. 681—696. 1 pl. 1913.)

The paper opens with a brief summary of the existing literature dealing with nuclear division in the protozoa and green algae.

An account is then given of nuclear division in *Tetraspora lubrica* which grows as gelatinous colonies in shallow, running water in the neighbourhood of Ithaca, N. V. The author regards the *Tetrasporaceae* nearly allied to the *Chlamydomonadaceae* The main points brought out in his investigation are as follows:

The nucleus in the resting condition has a chromatic reticulum, net knots and nucleole distributed in the same manner as in the higher plants. A definite spireme is formed from the reticulum. The spireme segments to form about thirteen chromosomes. The nucleole shows no signs of disintegration until the increase in chromatic material has come to an end. Centrosomes are not to be identified at any stage of the nuclear division. Cell-division is accomplished by the splitting of a granular cell-plate which has been formed by the central spindle. The splitting takes place from the centre outward. The entire pyrenoid segments to form several starch bodies. No differentiated central area is present.

In the discussion which concludes the paper, the author draws attention to the striking uniformity existing throughout the green plants on the phenomena of nuclear division, and points out that the *Euglena* type of mitosis has not been reported for any green plant. He is thus led to the view that the origin of the *Chlamydomonadaceae* from the *Euglenidae,* as suggested by Blackman & others, must be rejected. Agnes Arber (Cambridge).

Davis, B. M., Genetical studies on *Oenothera* III. Further hybrids of *Oenothera biennis* and *O. grandiflora* that resemble *O. Lamarckiana.* (Amer. Nat. XLVI. p. 377—427. July 1212.)

The writer maintains his earlier contention that *O. Lamarckiana* has arisen as a hybrid between types of *O. biennis* and *O. grandiflora,* and that a hybrid taxonomically similar to *O. Lamarckiana* can now be synthesized. In the 1911 cultures designed to test this hypothesis, a different biotype *O. biennis* was used in hybridizing with *O. grandiflora,* resulting in the production of plants more closely resembling *O. Lamarckiana* than did those of previous years. F_2 plants from earlier crosses show many variations of progressive and of retrogressive nature, some apparently of the rank of new species. The evidence against the existence of native American specimens of *O. Lamarckiana* is strengthened by consideration of a certain sheet in the Gray Herbarium. M. A. Chrysler.

Erikson, J., Rönnoxeln (*Sorbus aucuparia* × *suecica*). (Fauna och Flora. p. 136—139. 3 Textfig. Uppsala 1913.)

Der vom Verf. auf Vämö in Bleking, Südschweden, ent-

deckte und in Botaniska Notiser 1900 beschriebene Bastard wurde von ihm seit 1900 — mit Ausschluss der Jahre 1904, 05, 07, 08 und 09 — in bezug auf Fertilität beobachtet. In den Jahren 1901, 06 und 13 war die Fruchtbildung gut, woraus geschlossen wird, dass günstige klimatische Verhältnisse den Fruchtansatz von Bastarden erhöhen können. Grevillius (Kempen a. Rh.).

Kohlbrugge, J. H. F., Herders Verhältnis zu modernen Naturanschauungen. (Naturwissenschaften I. p. 1110—1116. 1913.)

Lange bevor Herder sich an die Niederschrift seiner „Ideen" machte, glaubten B. de Maillet, Maupertuis, Needham, del de Sales, Fabricius an die leibliche Deszendenz bei der Entstehung der Formen. Auch Rousseau und Moscati vertraten solche Auffassungen. Diese materialistisch-deszendenztheoretische Strömung, der auch Kant, Goethe und Schiller anfangs huldigten, verlief schnell im Sande und wurde später von Kant, Goethe, Schiller, Herder wieder verleugnet. Herder wie Goethe wurden zwar vorübergehend von der Deszendenztheorie beeinflusst, als Vorläufer Darwins können sie aber nicht angesehen werden. Beim Niederschreiben seiner „Ideen" hatte sich Herder ganz vom Einfluss der Deszendenztheoriker losgerissen, wenigstens soweit sie den Ursprung des Menschen behandelten. In den „Ideen" wird die Deszendenztheorie zurückgeworfen. Herder betrachtete alles im Lichte seiner vorgefassten, teleologischen Auffassung. „Einen Naturwissenschaftler Herder gibt es nicht." Verf. weist dies an der Hand von Citaten aus Herders „Ideen" nach.

W. Herter (Berlin-Steglitz).

Pellew, C., Note on Gametic Reduplication in *Pisum*. (Journ. Genetics. III. 2. p. 105—106. Sept. 1913.)

The author confirms the work of Vilmorin and Bateson (1911) that when a pea having tendrils (T) + round seed (R) is crossed with the "*Acacia*" variety in which the tendrils are represented by leaflets (t) and the seed wrinkled (r), partial coupling occurs between T and R in the gametes of F_1 in the ratio 31 TR : 1 Tr : 1 tR : 63 tr. Crosses in the form Tr × tR : gave the ratio 1 TR : 63 Tr : 63 tR : 1 tr No sign of factors others than roundness coupling with the factor for tendrils was observed. Among characters so tested were tallness and dwarfness, yellow and green cotyledons, purple and white flowers, glaucous and emerald foliage, fasciated and normal growth.

W. Neilson Jones.

Punnett, R. C., Reduplication Series in Sweet Peas. (Journ Genetics. III. 2. p. 77—102. Sept. 1913.)

The paper deals with some of the results obtained during the seasons 1908—13 with sweet peas.

Regarding the factors for blue flower colour (B), erect standard (E) and long pollen (L) (as opposed to red flower colour, hooded standard and round pollen) the author reaches the following conclusions:

1) Families homozygous for E or e: in matings of the nature of BL × bl, the reduplication series is 7 BL : 1 Bl : 1 bL : 7 bl; and in matings Bl × bL, the series is 1 BL : 7 Bl : 7 bL : 1 bl.

2) Families homozygous for L or l: the reduplication between B × E is 127:1 or 1:127 according to whether matings are of the form BE × be or Be × bE.

3) Families homozygous for B or b: data are not fully available yet.

4) Families heterozygous in all three factors: In matings of the form BEL × bel reduplication between B × L is now no longer on a basis of 7:1 but more nearly 5:1; also between B × E is now more nearly 63:1. It is concluded therefore: that what may be termed the normal linkage ratios are affected by the heterozygous nature of the third factor. The same kind of phenomena were met with in another series of families in which the characters involved were "dark axil", "fertile anthers" and "normal flower" as opposed to "light axil", "sterile anthers" and "cretin flower".

Simple 9:3:3:1 ratios also appeared in some crosses. The author points out that results calculated on Trow's hypothesis of primary and secondary reduplicated series agree closely with experimental numbers.

Diagrams are appended suggesting that the form of the series-whether even or odd-may possibly depend on whether the first division in the quadrants is periclinal or anticlinal.

W. Neilson Jones.

Saunders, C. R., Further contributions to the study of inheritance of hoariness in Stocks (Matthiola). (Proc. Royal Soc. 85 B. N⁰. 582. p. 540—545. 1913.)

The author's conclusions may be summarised as follows:

1) Sap colour in Stocks is due to the presence of two factors (C + R): in the absence of either or both the sap is colourless.

2) Hoariness depends on the presence of two factors (H + K) — the plant being glabrous in the absence of either or both.

3) The hoary effect of H + K is manifested only when C + R are both present in addition (i. e. hoary plants contain all four factors).

The following generalisations may be made with regard to behaviour on breeding.

4) Glabrous plants bred together may yield an F_1 (*a*) all hoary (*b*) mixed hoary and glabrous or (*c*) all glabrous.

5) When F_1 from unions between glabrous plants is all glabrous all later generations from F_1 will be glabrous.

6) When F_1 from such matings is all hoary, F_2 will contain hoary and glabrous in proportions depending on whether F_1 is heterozygous in 2, 3, or 4 factors.

Thus: F_1 heterozygous in 2 factors will give a ratio 9 hoary: 7 glabrous
" " " 3 " " " " " 27 " 37 "
" " " 4 " " " " " 81 " 175 "

7) When hoary and glabrous plants are crossed there may be in addition the above: the ratio 3 hoary: 1 glabrous where F_1 is heterozygous for only one factor.

In the earlier accounts the author postulated two factors H + K for hoariness. Since types HK + Hk only were met with, one of these factors was subsequently omitted. Recently however the author has used another type of glabrous plant which from its behaviour proves to be of the form hK. The earlier hypothesis is thus proved correct and is now adopted.

W. Neilson Jones.

Lagerheim, G., Solförmörkelsens inverkan på ljuskänsliga växter. [Die Einwirkung der Sonnenfinsternis auf lichtempfindliche Pflanzen]. (Fauna och Flora. p. 106—110. 2 Textfig. Uppsala. 1912.)

Während der Sonnenfinsternis am 17. April 1912 wurden im Gewächshaus der Universität Stockholm folgende Beobachtungen gemacht.

Bei der einfach fiederblättrigen Papilionacee *Calpurnia aurea* waren die Blättchen um 12 Uhr mittags bei starkem Sonnenlicht und hoher Wärme schräg nach oben gerichtet, im Verlaufe der Verfinsterung — bei gleichzeitig erniedrigter Temperatur — stellten sie sich horizontal und begannen, als die Sonne (etwa um 1^{30} Uhr) zu $^{9}/_{10}$ verdunkelt war, sich zu senken; sie erreichten aber keine vollständige Schlafstellung und erhoben sich bald nach dem Wiedererscheinen des Lichtes in die Horizontallage. Auch bei Akazien aus Bolivien und bei *Aeschynomene Elaphroxylon* beobachtete Verf. unvollständige Schlafbewegungen der Blättchen, die sich hier schräg aufwärts richteten. Bei *Desmanthus virgatus* machten die Blättchen vollständige Schlafbewegungen — nach oben — durch und fingen erst etwas nach 2 Uhr an zu erwachen.

Eine nachtblühende *Nicotiana*-Form öffnete die Blüten vollständig während der Sonnenfinsternis. Bei *Sisyrinchium bermudianum*, dessen Blüten nachts geschlossen sind, blieben diese jedoch während der ganzen Zeit der Finsternis offen.

Grevillius (Kempen a. Rh.).

Arber, A., A Note on *Trigonocarpus*. (Ann. Bot. XXVIII. p. 195—196. pl. VI. f. 6—7. 1914.)

Sections of a new specimen of *Trigonocarpus* show that the sclerenchyma of the micropylar beak is preserved as far as the extreme apex. It also appears that the nucellus was free from the integument almost to the base of the seed. W. N. Edwards.

Arber, E. A. N., A revision of the seed impressions of the British Coal Measures. (Ann. Bot. XXVIII. p. 81—108. pl. VI—VIII. 1914.)

Those seeds from the British Coal Measures which do not show internal structure are classified under 14 genera, of which 9 are new, viz.: *Platyspermum, Cornucarpus, Samarospermum, Microspermum, Megalospermum, Radiospermum, Neurospermum, Schizospermum* and *Pterospermum*. The other genera recognised are: *Trigonocarpus*, Brongn., *Cardiocarpus*, Brongn., *Samaropsis*, Goepp., *Rhabdocarpus*, Berger, and *Cordaicarpus*, Geinitz. Descriptions are given of several new species: *Trigonocarpus Morpeyi, Platyspermum Kidstoni, P. rugosum, Rhabdocarpus Lillieanus, Radiospermum elongatum, R. grande, R. ornatum, R. problematicum, Neurospermum Kidstoni*, and *Pterospermum anglicum*.

Twenty-seven other species from the Coal Measures of Britain are described. W. N. Edwards.

Arber, E. A. N., On the Discovery of Fossil Plants in the Old Hill Marls of the South Staffordshire Coalfield. (Geol. Mag. X. 5. p. 215—216. 1913.)

The flora suggests lower Transition Coal Measures; 15 species

I. Allgemeines.

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Procházka, J. S. 1913. Miszellen aus dem Naturschutz. (Krása našeho domova. 1913. p. 55. Böhmisch.) [Interessante Angaben über namentlich von Seite der Botaniker verursachten Verwüstungen und Ausrottungen der Floren; einige Mitteilungen aus der Flora Böhmens und die ihn drohenden Gefahren. — Jar. Stuchlík (Zürich.)]

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Procházka, J. S. 1912. Nationalparken und Reservationen. (Sborník klubu přírodovědeckého. 1912. p. 17. 13 A.) [Dem Naturschutz, überwiegend dem Schutz der Flora gewidmete Arbeiten mit wertvollen Angaben über die zu schützenden Arten. — Jar. Stuchlík (Zürich).]

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II. Anatomie.

Buscalioni, L. e **G. Muscatello. 1913.** Studio anatomo-biologico sul genere Saurania Wild. con speciale riguardo alle specie americane. (Malpighia. XXVI. p. 49—56.)

Catalano, G. 1912. Intorno alla struttura delle radici di „Chamaedorea elatior". (Boll. r. Orto bot. Giard. col. Palermo. XI. p. 163—164.)

Catalano, G. 1913. Intorno alla struttura delle radici di Chamaedorea elatior. (Ann. di Bot. XII. p. 151.)

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Vilikovský, V. und **B. Stempel 1913.** „Amylometer", Apparat zur zahlenmässigen Bestimmung des Stärkegehalts in Kartoffeln. (Chemické Listy pro vědu a průmysl. Bd VII. Böhmisch). [Ein geistreiches Apparat, das analogisch dem Rechenschiebern konstruiert ist und durch welches man direkt bei beliebiger Menge von Kartoffeln den Stärkegehalt ablesen kann. Wichtig für landwirtschaftliche Forschungsstationen. — Jar. Stuchlík (Zürich).]

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XXI. Biographie, Necrologie.

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are recorded, including *Sigillariostrobus nobilis,* Zeiller, which is new to Britain. W. N. Edwards.

Bancroft, N., Pteridosperm Anatomy and its Relation to that of the *Cycads.* (New Phyt. XIII. p. 41—68. 20 textfig. 1914.)

This paper is devoted to a fully illustrated re-statement of the various views regarding the origin of Cycadean vascular anatomy which have been advanced by Scott, Worsdell, Chodat, de Fraine, and other writers. Agnes Arber (Cambridge).

Gordon, W. T., On *Rhetinangium arberi,* a new genus of *Cycadofilices* from the Calciferous Sandstone Series. (Trans. Roy. Soc. Edinburgh, XLVIII. 4. p. 813—815. 3 pl. 1912.)

The long stem of *Rhetinangium arberi,* gen. et sp. nov., bore spirally arranged leaves, and had a protostelic vascular axis with exarch protoxylem groups. The leaf-trace was formed by the union of several adjacent primary strands, the protoxylem being abaxial throughout. The primary xylem resembles that of *Heterangium* and *Medullosa,* and particularly *Megaloxylon,* to which the new genus seems to be most closely allied, though in the occurrence of short water-storage, tracheids *Megaloxylon* is more specialised. *Rhetinangium* is distinguished from *Heterangium* by the exarch xylem, the presence of secretory elements in the inner cortex, and the sclerotic hypodermal zone. W. N. Edwards.

Kindle, E. M., Note on a Process of Fossilisation in the Palaeozic Lycopods. (Geol. Mag. X. 8. p. 337—340. pl. 11. 1913.)

Numerous examples of *Lepidodendron* occur in the Pottsville Sandstones of Indiana with well-preserved carbonised bark but no trace of any of the internal tissues. It is concluded that, as in the case of the modern *Betula papyracea,* the wood of *Lepidodendron* decayed far more readily than the bark. W. N. Edwards.

Matthew, E. F., A new flora in the older Palaeozoic rocks of Southern New Brunswick, Canada. (Trans. Roy. Soc. Canada. VI. sect. 4. p. 83—99. 2 pl. 1912.)

This flora, which is considered to be Lower Silurian, contains only two well-defined species. These are *Himantophyton castorense,* gen. and sp. n., and *Arthrostigma arietensi,* n. sp. Fructifications, as well as stems and leaves, are described. Fragments of a stem resembling *Psilophyton* also occur, and leaves of filicoid plants compared with *Archaeopteris* and *Eremopteris.* On the evidence of these specimens it is considered that the flora was maritime. The ecological significance of the flora of the "Fern Ledges", St. John basin, is also discussed, and fluvial, deltaic and upland elements are distinguished.
W. N. Edwards.

Warren, E., On some specimens of fossil wood in the Natal Museum. (Ann. Natal Mus. II. 3. p. 345—380. 3 pl. 1912.)

Two species of *Dadoxylon* are described from the Permo-Carboniferous of Natal. One of these, which also occurs doubtfully in Cretaceous beds, is regarded as identical with *Dadoxylon australe,*

Arber, from the Permo-Carboniferous of Australia while the second is compared with *Araucarioxylon latiporosum,* Kraus, from the Jurassic of Spitzbergen. Dicotyledonous wood probably of late tertiary age, from the coast of Zululand is also recorded, and identified with *Eugenia cordata,* Laws. The method of fossilisation and structure of these specimens are described and illustrated in detail. W. N. Edwards.

Butler, E. J. and **A. Hafiz Khan.** Some New Sugar Cane Diseases. (Mem. Dept. Agric. India. VI. 6. p. 181—208. 6 pl. Dec. 1913.)

In the course of investigations on the Red Rot of Sugar Cane, the authors have detected three other diseases which they name and describe as follows: "Wilt" *Cephalosporium Sacchari* Butler sp. nov.; "Collar Rot" *Hendersonia Sacchari* Butler gen. et sp. nov.; "Helminthosporiose" *Helminthosporium Sacchari* Butler sp. nov.

The first frequently accompanies Red Rot and resembles it in causing reddening of the pith. It produces stunted growth and ultimately withering of the canes and even of whole stools. Experiments show that the fungus enters through wounds, uninjured root-eyes and through planted sets. The new genus *Hendersonia* causing the second disease is characterised amongst the *Phoeophragmieae* in possessing spores of two types in each loculus, some brown 2—3 celled, others hyaline, and non septate. The damage caused by this fungus is probably not great. In the last case (*Helminthosporium*) it is the leaves that suffer, red spots being produced which run together and form long streaks. Each disease is described in detail and fully illustrated, the methods of control being also given.

A. D. Cotton.

Juritz, C. F., Chlorosis in Orchards near Bloemfontein. (Agric. Journ. Union of South Africa. IV. p. 854—865, V. p. 102—112. 1912—13.)

Records observations on chlorosis accompanied by general lowering of vitality. It is stated that in general the inability to take up iron is the result of impaired vitality which may be brought about by bad soil conditions or fungus diseases of the roots. Amongst the former may be mentioned, excessive marliness, defective aeration and too large a proportion of magnesia relatively to lime. In the present case unsatisfactory moisture conditions and the existence of an impermeable substratum of marl are largely responsible. The chemical character and physical conditions of the soil are dealt with, and analyses given. A. D. Cotton.

Mac Alpine, D., Handbook of Fungus Diseases of the Potato in Australia. (Dept. Agric. Victoria. 215 pp. pl. 50. 1 map. Melbourne 1911.)

This volume brings together a large amount of useful information concerning potato-diseases. Though largely a compilation it contains also the results of a considerable amount of work by the author especially in connection with the Irish Blight (*Phytophthora infestans*) which is discussed very fully. Other diseases dealt with

are: *Macrosporium Solani, Hypochnus Solani,* "Scab", *Fusarium solani* and others of minor importance. A. D. Cotton.

Mac Kinnon, E., Two new Grass Smuts. (Journ. Proc. Roy. Soc. N. S. Wales. XLVI. p. 201—204. 4 pl. 1913.)

The two fungi described are *Sorophorium Panici* on *Panicum flavidum,* and *Ustilago panici-gracilis* on *P. gracile.* Morphological and cultural notes are given. A. D. Cotton.

Massee, G., A disease of Narcissus bulbs. (Kew Bull. Misc. Inform. N⁰. 8. p. 307—309. 1 pl. 1913.)

The fungus *Fusarium bulbigerum* Cooke & Mass. is described as causing a disease in various kinds of Narcissus, and occasioning great loss amongst the bulbs. The disease first attacks the leaves and passes down, probably by a series of secondary infections, to the bulb, the decay of which is hastened by the attacks of other fungi and eelworms. *Fusarium* spores are produced abundantly on the aerial parts, whilst numerous chlamydospores occur in the tissues of the bulb and leaf. A. D. Cotton.

Massee, G. and **I.,** Mildews, Rusts and Smuts. (229 pp. 5 pl. London, Dulau & Co. 1913. Price 7/6.)

A handbook of the British species of *Peronosporaceae, Erysiphaceae, Uredinaceae* and *Ustilaginaceae.* Concise descriptions for genera and species are given and keys provided, in the case of the *Peronosporaceae* and *Erysiphaceae* for species as well as genera. The structure and development is summarised and also the biology and parasitism of the *Uredineae.* Throughout the work the authors include in brackets those species not yet met with in Britain, but which are parasitic on indigenous host-plants and may be expected to occur. A. D. Cotton.

Stoward, F., The Effect of Certain Chemical Substances on the Buds of Potato Tubers and their desinfective action on Potato Blight. (Proc. roy. Soc. Victoria. XXIV. 2. p. 270—292. 4 pl. 1912.)

The objects of enquiry were to ascertain the influence of certain antiseptic compounds in aqueous solution on the blight-free and blight-infected tubers particularly with regard to the hibernating mycelium of *Phytophthora infestans* and the injury of the "eyes". The experiments show that during the earlier stages of immersion aqueous solutions of NaCl, H_2SO_4 and H_3BO_3 gain entrance chiefly, if not entirely, through the buds. When the skin has been damaged by a fungus the solution also passes through the injured portions.

With sulphuric acid if the steeping is restricted within certain limits of time the vitality of the buds is unimpaired, but a steep of 10 hours duration in a 10 per cent solution destroyed both the buds and the mycelium in the case of infected tubers, without however seriously damaging the cooking, edible or storage qualities.

A. D. Cotton.

Knowles, M. C., The maritime and marine Lichens of Howth. (Sci. Proc. roy. Dublin Soc. XIV. (N. S.) 6. p. 79—143. pl. 3—9. Map 1. 1913.)

After an introduction consisting of a few remarks concerning tides, wind, climate, moisture, that is the climatic conditions on a large scale, the attempt is made to give an ecological account of the lichens of Howth.

Leaving aside the full use of the terms "formation" and "association" except as a general heading, the authoress groups the lichens vegetation for purposes for description, into saxicolous, corticolous and terricolous lichens.

As regards the distribution the following Belts and Zones are distinguished:

A. The Lichens of the Rocky coast (Saxicolous lichens)

I. Silicious Rocks.

1) The *Ramalina*-Belt. The *Ramalina*-Belt stretches from the high water mark of an ordinary spring tide to the top of the highest cliffs and even further inland. The distinction of the characteristic species of *Ramalina*-appears to be very difficult, and the authoress would make no difference between *R. scopulorum* and *R. cuspidata* which form the chief constituents of the belt for the purposes of this paper.

The lower *Ramalina*-zone is occasionally touched by spray from the sea, and the plants are therefore washed free of dirt. The specimens are lighter in colour, and usually very fertile. The podetia are upright, stiff, simple or slightly branched. The upper *Ramalina*-zone consists of plants darker in colour, much branched and usually barren. The tips of the branches are incurved. The whole zone offers a characteristic glaucous appearance. It is beyond the ordinary spray zone. There exists in this belt an extensive foliaceous and crustaceous lichen subvegetation, as long as light and air can reach the substratum between the *Ramalina* plants. Even in this subvegetation a more or less distinct zonation can be made out. The Parmelias occupy the light zone. *Parmelia conspersa, Mougeotii, prolixa* and *fuliginosa* are the most typical maritime forms, whereas *P. perlata, saxatilis, omphalodes* and *physodes* are more alpine in character. On the Parmelias follow *Physcia aquile* and *parietina,* and the various crustaceous lichens. Under shelter of the *Ramalina* plants, two mosses, *Grimmia maritima* and *Weissia rupestris* penetrate almost down to the sea.

2) The Orange Belt.

The orange colour is produced mainly by *Physcia parietina, Placodium murorum, tegulare* and *lobulatum*. This latter species may pas downwards into the *Pelvetia canaliculata*-zone, and we may find the upper outrunners of the *Verrucaria-maura*-belt here too.

3) The *Lichina* Vegetation The upper limit of this coincides with the upper limit of the *Lichina* plants.

4) The *Verrucaria maura* Belt.

5) The Belt of Marine Verrucarias. The dominant species here are *V. microspora, striatula* and *mucosa,* which mix with the alga *Hildebrandtia prototypus.*

II. Calcareous Rocks. No Ramalinas are found on these rocks, there are few orange Lichens, and species of *Verrucaria* are practically absent. Otherwise the rock is covered almost completely with *Arthopyrenia foveolata* (chiefly in the higher zones).

B. Corticolous Lichens.

C. Terricolous Lichens.

The vegetation of B. and C. is outlined but this is not very well developed in the district.

The paper concludes with a systematic list of the Howth Lichens, and a Bibliography. There are three new species: *Lecania atrynioides, Acarospora Benedarensis* and *Verrucaria Lorrain-Smithii.*

O. V. Darbishire (Bristol).

Wheldon, J. A. and **W. G. Travis.** Lichens of Arran. (Journ. Bot. LI. p. 248—253. 1913.)

The authors enumerate 119 species, but they confined their own field work almost entirely to the coast, being prevented from extending their field of operations to the mountains. Their list includes the lichens enumerated by Leighton and Crombie, and additional unrecorded material collected by W. West. Some reference is made to the nature of the lichen substrata.

O. V. Darbishire (Bristol).

Kashyap-Shiv, R., The Structure and development of the prothallus of *Equisetum debile,* Roxb. (Ann. Bot. XXVIII. p. 163—181. 45 Textfig. 1914.)

The author records that in some cases the result of germination of the spores of *Equisetum debile,* Roxb., may be a primary tubercle from which the mature prothallus arises. In the older stage no traces of the primary tubercle remain. The prothalli of this species are radially symmetrical from the first and the constitute hemispherical cushions, the lower half consisting of compact parenchymatous tissue, the upper part of erect lobes; these are erect even when not exposed to light. When exposed to direct light the prothallus is red, owing to the possession of a pigment in addition to the chlorophyll; in a shaded position the prothallus is green, when it is shaded in part and exposed in part both colours may be seen side by side. The prothallus contains a fungus; the lower compact part usually occupies a little less than half the height but in this matter there is a good deal of variety. A well grown prothallus is 2—3 centimeters in diameter and 2—3 millimeters in height; it may bear from one to fifteen plants-eight to ten being a not unusual number. There are no purely male prothalli, most prothalli seem to bear archegonia only and a prothallus forming antheridia only produces them after its own archegonia have withered. The embedded antheridia are developed from a superficial cell and are intermingled with paraphyses. The archegonium has only one neck-canal cell, while the other species of *Equisetum* have two. In the form of the prothallus, the single neck-canal cell, the structure of the antheridia and the presence of paraphyses *E. debile* curiously recalls *Lycopodium cernuum*. The foot and root arise from the hypobasal part of the embryo, stem and leaves from the epibasal part. The first leaf-whorl usually has three members, but there may be two or four as in other species. The first branch leaves a gap in the stele and parenchyma passes into the middle of the latter. A little higher up the main stele is a hollow cylinder, which breaks up, further up into separate bundles.

Isabel Browne (University College, London).

Lang, W. H., Studies in the Morphology and Anatomy of the *Ophioglossaceae*. II. On the Embryo of *Helminthostachys*. (Ann. Bot. XXVIII. p. 19—37. with Plate and 9 Textfig. 1914.)

An at early stage the embryo of *Helminthostachys* consists of three tiers of cells, the first and second forming the suspensor the third the embryo proper. The large foot arises from the hypobasal part of the latter, while the apex of the stem, the first leaf and probably the primary root arise from its epibasal part. Campbell states that the first leaf remains rudimentary, but the author finds that this may or may not be so. There appears to be some doubt as to whether this first leaf originates independently of the stem or from the first segment of the latter. As the embryo developes the direction of its growth changes. Bower has claimed that while in the Seed Plants the primary root faces the suspensor and is a continuation of the primary axis, in the Pteridophyta it is always a lateral appendage. This was not so in *Helminthostachys* where the root appeared to originate as a continuation of the axis, though it was early displaced owing to the growth of the foot. Moreover from Campbell's figures of *Danaea* and Lyon's figure of *Botrychium obliquum* the primary root here too appears to be a continuation of the axis; so that there is some evidence for regarding the primary root of the Filicales as potentially a main or tap root, comparable in position to that of the Seed-Plants.

The paper contains a critical account of the embryology of the *Filicineae*. Bower's generalization that the relation of the apex of the axis to the primary segmentation of the embryo is constant and that this apex occupies as nearly as possible the centre of the epibasal hemisphere is accepted. His view that the possession of a suspensor is a primitive character is also accepted. But whereas Bower seems to regard the suspensor as biologically useful in carrying the embryo into the bulky prothallus and believes its suppression, associated with the development of less bulky prothalli, to be a simplification advantageous in avoiding an awkward curvature of the developing embryo the author is inclined to believe that the occurrence of a suspensor and its suppression may be explained on morphological rather than on biological grounds. When present it would seem to represent the last indication of a row of cells often formed in the lower plants on germination. It may, in fact, be a juvenile filamentous stage rapidly passed over or often suppressed. If this were so we should see analogies with the germination of the spores of some Algae, Bryophyta and Pteridophyta where a filamentous stage is hurried over or suppressed and with the presence of a cell at the base of the sporogonium, taking no part in the development of the latter. Finally it is suggested that the presence of a suspensor in the higher Seed-Plants may be a character retained from a filicinean ancestry.

Isabel Browne (University College, London).

Baker, L., Note on accommodation in *Polygala vulgaris*. (Journ. Bot. p. 347—350. 2 figs. December 1913.)

This species is recorded mainly as a constituent of dry heathy or grassy vegetation. Measurements are given of 20 to 30 specimens of plants from *a*) garden, *b*) heath, *c*) grassland, *d*) bog. The bog form grows with *Sphagnum, Juncus, Molinia, Nardus* and *Ulex*

europaeus and differs in habit. From the substratum of *Sphagnum* and humus a limited number of thin etiolated stems arise, and grow through the canopy of grasses, etc. until this is overtopped, then the branches give rise to rosettes with leaves resembling the drier heathy habit of growth. The species shows therefore, considerable plasticity in response to variations of habitat.

W. G. Smith.

Balfour, J. B., Primulas of the Bullate section. (Trans. Bot. Soc. Edinburgh. XXVI. 2. p. 188—205. 6 pl. 1913.)

The revision of the bullate section is the first of a series to be given embodying the results of the author's labours on the species of *Primula*. The section *Bullatae* of Pax is remodelled — the two herbaceous species *P. Davidii* and *P. ovalifolia* being excluded from the section and *P. Lacei* which Pax referred to another section being transferred to it. The group augmented by three recently described species and two — *P. rufa* and *P. Monbeigii* — described here for the first time he re-names *Suffruticosae*. In the introductory part are given copious notes on the morphology of the group. Seven out of the nine species are illustrated by photographs.

W. G. Craib (Kew).

Blomqvist, S. G: son, Ett bidrag till kännedomen om *Cuscuta europaeas* värdväxter. [Ein Beitrag zur Kenntnis der Nährpflanzen von *Cuscuta europaea*. (Svensk Bot. Tidskr. VII. p. 363—366. 1913.)

In einer kräuterreichen, dornsträuchartigen Formation auf der Insel Oeland wurden die Nährpflanzen der auf zerstreuten Flecken reichlich auftretenden *Cuscuta europaea* notiert. Es steigen durch diese Funde die in Schweden angetroffenen Wirtspflanzen von 106 Arten und 37 Familien auf 151, bezw. 45.

Gewöhnlich geht *Cuscuta* an den Flecken, wo sie sich ausbreitet, von einer vorgezogenen Nährpflanze aus und greift die Pflanzen in der Nähe an; trifft der von einem solchen Zentrum ausgehende Stamm dann noch eine ihm besonders zusagende Pflanze, so wird ein neues Zentrum ausgebildet, u. s. w.

Verf. bemerkt u. a., dass an *Juniperus communis* keine Haustorienbildung stattfindet. Grevillius (Kempen a. Rh.).

Keller, R., Die Rosenflora des Kantons Zürich. (Beitr. z. Kenntn. d. Schweizerflora. XIV. Herausgeg. v. Hans Schinz (Zürich). Mitt. bot. Mus. Univ. Zürich. LXV. 63 pp. 1913.)

Gegenüber der früheren Arbeit des Verf.: „Wilde Rosen des Ct. Zürich" (Bot. Centralbl. XXV. N⁰ 31—36. 1888), wurden bei der Neubearbeitung des gleichen Florengebietes hauptsächlich die im Lauf der Jahre gemachten Nachprüfungen in freier Natur verwendet, die als Ergebnis eine Reihe von Korrekturen zur Folge hatten.

Verf. hat bei jeder Art eine Zusammenstellung der Variationsbreite gegeben, um jenen Botanikern, die der Rosenflora des Gebietes nach vorliegender Arbeit ihre Aufmerksamkeit zuwenden möchten, zugleich Winke zu geben, in welcher Richtung vom Verf. hier nicht erwähnte Formen erwartet werden können.

Eugen Baumann.

Stoklasa, J., J. Šebor und **E. Senft.** Beitrag zur Kenntnis der Zusammensetzung des Chlorophylls. (Beih. bot. Cbl. 1. XXX. p. 167—235. 10 T. 1913.)

Verff. gelangen zu der Ueberzeugung, dass das Chlorophyll in der Pflanzenzelle niemals phosphorfrei ist, was Willstätter behauptet hatte. Das von Willstätter untersuchte „kristallisierte Chlorophyll" sei ein Kunstprodukt, das mit dem natürlichen Chlorophyll, wie es in der Pflanzenzelle vorkommt, nichts zu tun habe.

Das Chlorophyll besteht aus drei verschiedenen Arten von Verbindungen:

1. Phaeophorbin und dessen Metallverbindungen, in Alkohol und Aether, nicht in Petroläther löslich,

2. Phaeophytin und Phaeophytide, in Aether fast unlöslich, in Alkohol und Petroläther löslich,

3. Chlorolecithine und Phaeophorbinphosphatide, in allen drei Lösungsmitteln löslich.

Die Phosphorsäure ist an Glyceridreste von ungesättigten Säuren oder Oxysäuren gebunden. Im Frühjähr und Sommer bilden sich die ungesättigten Säuren, daneben verläuft eine Oxydation zu Oxysäuren, die auch am Präparate, sowie an den aus demselben gewonnenen Säuren weiter fortschreitet. Das Phaeophorbin spielt dabei vermutlich die Rolle eines Katalysators und zwar im Sonnenlichte im Sinne einer Reduktion, im Dunkeln im Sinne einer Oxydation. Die Metallverbindungen enthalten vorwiegend Magnesium. Dieses Element muss als treuer Begleiter des Phosphors angesehen werden.

Die Farbenveränderung des Blattes im Herbste wird auf hydrolytische Spaltung des Chlorophylls und Entstehung von Phaeophytin und Phosphatiden zurückgeführt. Diese Stoffe sind bräunlich gefärbt und lassen daher die gelbe und rote Farbe des Xanthophylls und der Carotene znr Geltung kommen.

W. Herter (Berlin-Steglitz).

Tiemann, Ist es möglich der flachwurzelnden Fichte eine tiefergehende Wurzelbildung anzuerziehen? (Forstwiss. Centralb. XXXV. p. 361—368. 1913.)

Der Verf. bringt wenig positives. Er äussert eigentlich nur seine Ansicht, wie möglicherweise das im Titel angegebene Ziel zu erreichen wäre und überlässt es anderen, diese Gedanken in die Tat umzusetzen. Besser wäre gewesen wenn er selbst systematisch in der angegebenen Richtung Versuche angestellt hätte.

Neger.

Personalnachricht.

Gestorben: Dr. **L. Dippel,** der ehem. Prof. d. Bot. a. d. Techn. Hochschule in Darmstadt, der bekannte Dendrologe, daselbst am 4. März im Alter von 87 Jahren.

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Inhalt.

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